**Chapter 8**

PROBLEM 8-5

a. 

2011 sales were 122.72% of those in 2010.

b. 

2011 net earnings were 100.80% of those in 2010.

Net Income Before Minority Share of

c. 1. Net Profit Margin = Earnings Equity Income and Nonrecurring Items

Net Sales

2011 2010

 

Net Income Before Minority Share of

2. Return on Assets = Earnings and Nonrecurring Items

Average Total Assets

2011 2010

 

3. Total Asset Turnover = 

2011 2010

 

1.12 times per year 1.10 times per year

4. DuPont Analysis: Return on = Net Profit x Total Asset

Assets Margin Turnover

2011 10.42\* = 9.39% x 1.11

2010 12.72\* = 11.56% x 1.10

\*Rounding causes the difference from the 10.38% and 12.67% computed in (2).

5.

|  |  |  |
| --- | --- | --- |
|  | 2011 | 2010 |
| Operating income  Net sales  Less: Cost of product sold  Research and develop-  ment expenses  General and selling  Operating income | $1,589,150  $ 651,390  135,314  526,680  $ 275,766 | $1,294,966  $ 466,250  113,100  446,110  $ 269,506 |

Operating Income Margin = 

2011 2010

 

= 17.35% = 20.81%

6. Return on Operating Assets = 

2011 2010

 

= 19.53% = 23.24%

7. Operating Asset Turnover = 

2011 2010

 

= 1.13 times = 1.12 times

per year per year

8. DuPont Analysis with Operating Ratios:

Return on = Net Profit x Total Asset

Assets Margin Turnover

2011 19.61%\* = 17.35% x 1.13

2010 23.31%\* = 20.81% x 1.12

\*Rounding causes the difference from the 19.53% and 23.24% computed in (6).

Net Income Before Minority Share

of Earnings and Nonrecurring Items +

9. Return on Investment = [(Interest Expense) **×** (1 − Tax Rate)]

Average (Long-Term Liabilities) + Equity

|  |  |  |
| --- | --- | --- |
|  | 2011 | 2010 |
| Net earnings before minority  share  Interest expense  Earnings before tax  Provision for income tax  Tax rate  1 – tax rate  Interest expense x  (1 – tax rate)  Net earnings before minority  share + [interest expense  x (1 – tax rate)]  Long-term debt and equity  Return on investment | $ 149,260  18,768  263,762  114,502  43.4%  56.6%  10,623    159,883  1,019,420  15.7% | $ 149,760  11,522  271,500  121,740  44.8%  55.2%  6,360  156,120  933,232  16.7% |

Net Income Before Nonrecurring

10. Return on Common Equity = Items − Preferred Dividends

Average Common Equity

2011 2010

 

= 17.06% = 19.03%

d. Profits in relation to sales, assets, and equity have all declined. Turnover has remained stable. Overall, although absolute profits have increased in 2011 compared with 2010, the profitability ratios show a decline.

PROBLEM 8-6

Net Income Before Minority Share of Earnings

a. 1. Net Profit Margin = Equity Income and Nonrecurring Items

Net Sales

|  |  |  |
| --- | --- | --- |
| 2011 | 2010 | 2009 |
|  |  |  |
| = 6.07% | = 3.96% | = 3.76% |

Net Income Before Minority Share of

2. Return on Assets = Earnings and Nonrecurring Items

Average Total Assets

|  |  |  |
| --- | --- | --- |
| 2011 | 2010 | 2009 |
|  |  |  |
| = 6.74% | = 4.21% | = 3.82% |

3. Total Asset Turnover = 

|  |  |  |
| --- | --- | --- |
| 2011 | 2010 | 2009 |
|  |  |  |
| = 1.11 times  per year | = 1.07 times  per year | = 1.02 times  per year |

4. DuPont Analysis

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Return on  Assets | = | Net Profit Margin | x | Total Asset  Turnover |
| 2011: 6.74%  2010: 4.24%  2010: 3.84% | =  =  = | 6.07%  3.96%\*  3.76%\* | x  x  x | 1.11 times  1.07 times  1.02 times |

\*Rounding difference from the 4.21% and 3.82% computed in (2).

5. Operating Income Margin = 

|  |  |  |  |
| --- | --- | --- | --- |
|  | 2011 | 2010 | 2009 |
| (2) Net sales  Less:  Material and manufacturing  costs of products sold  Research and development  General and selling  (1) Operating income  (1) Divided by (2) | $1,600,000  740,000  90,000  600,000  $1,430,000  $ 170,000  10.63% | $1,300,000  624,000  78,000  500,500  $1,202,500  $ 97,500    7.50% | $1,200,000  576,000  71,400  465,000  $1,112,400  $ 87,600  7.30% |

6. Return on Operating Assets = 

|  |  |  |  |
| --- | --- | --- | --- |
|  | 2011 | 2010 | 2009 |
| Operating Income\_\_\_\_\_ Average Operating Assets | $170,000  $1,390,200  = 12.23% | $97,500  $1,160,000  = 8.41% | $87,600  $1,090,000  = 8.04% |

7. Operating Asset Turnover = 

|  |  |  |  |
| --- | --- | --- | --- |
|  | 2011 | 2010 | 2009 |
| Net Sales\_\_\_ \_ Average Operating Assets | $1,600,000  $1,390,200  = 1.15 times | $1,300,000  $1,160,000  = 1.12 times | $1,200,000  $1,090,000  = 1.10 times |

8. DuPont Analysis with Operating Ratios

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Return on  Assets | = | Net Profit Margin | x | Total Asset  Turnover |
| 2009: 12.22%\*  2010: 8.40%\*  2011: 8.03% | =  =  = | 10.63%  7.50%  7.30% | x  x  x | 1.15  1.12  1.10 |

\*Rounding difference from the 12.23%, 8.41%, and 7.98% computed in (6).

Net Income Before Minority Share of

Earnings and Nonrecurring Items +

9. Return on Investment = [Interest Expense **×** (1 − Tax Rate)]

Average (Long-Term Liabilities + Equity)

Estimated tax rate:

|  |  |  |  |
| --- | --- | --- | --- |
|  | 2011 | 2010 | 2009 |
| (1) Provision for income taxes  (2) Earnings before income taxes  and minority equity  (1) **÷** (2)  1 – tax rate  (3) Interest expense x (1 – tax rate)  $19,000 x 61.00%  $18,200 x 59.00%  $17,040 x 58.00%  (4) Earnings before minority equity  (3) + (4) (A)  (5) Total long-term debt  (6) Total stockholders’ equity  (5) + (6) (B)  (A) **÷** (B) | $ 62,049  $ 159,100  39.00%  61.00%  11,590  97,051  108,641  211,100  811,200  1,022,300  10.63% | $ 35,731  $ 87,150  41.00%  59.00%  10,738  51,419  62,157  121,800  790,100  911,900  6.82% | $ 32,659  $ 77,760  42.00%  58.00%  9,883  45,101  54,984  214,000  770,000  984,000  5.59% |

Net Income Before Nonrecurring Items –

10. Return on Total Equity = Dividends on Redeemable Preferred Stock

Average Total Equity

|  |  |  |  |
| --- | --- | --- | --- |
|  | 2011 | 2010 | 2009 |
| Net income etc.  Average total equity | $86,851  $811,200 | $42,919  $790,100 | $37,001  $770,000 |

= 10.71% = 5.43% = 4.81%

b. All ratios computed indicate a significant improvement in profitability.

PROBLEM 8-7

Net Income Before Minority Share of

a. 1. Net Profit Margin = Earnings Equity Income and Nonrecurring Items

Net Sales

|  |  |  |
| --- | --- | --- |
| 2009 | 2010 | 2011 |
| $171,115  $1,002,100  = 17.08% | $163,497  $980,500  = 16.67% | $143,990  $900,000  = 16.00% |

Net Income Before Minority Share of

2. Return on Assets = Earnings and Nonrecurring Items

|  |  |  |
| --- | --- | --- |
| 2009 | 2010 | 2011 |
| $171,115  $839,000  = 20.40% | $163,497  $770,000  = 21.23% | $143,990  $765,000  = 18.82% |

3. 

|  |  |  |
| --- | --- | --- |
| 2009 | 2010 | 2011 |
| $1,002,100  $839,000  = 1.19 times  per year | $980,500  $770,000  = 1.27 times  per year | $900,000  $765,000  = 1.18 times  per year |

4. DuPont Analysis

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Return on  Assets | = | Operating Income  Margin | x | Total Asset  Turnover |
| 2009: 20.33%\*  2010: 21.17%\*  2011: 18.88%\* | =  =  = | 17.08%  16.67%  16.00% | x  x  x | 1.19 times per year  1.27 times per year  1.18 times per year |

\*Rounding difference from the 20.40%, 21.23%, and 18.82% computed in (2).

Net Income Before Minority Share of

Earnings and Nonrecurring Items +

5. Return on Investment = [Interest Expense x (1 − Tax Rate)]

Average (Long-Term Liabilities) + Equity

Estimated tax rate:

|  |  |  |  |
| --- | --- | --- | --- |
|  | 2009 | 2010 | 2011 |
| (1) Provision for income taxes  (2) Earnings before income taxes  tax rate [(1) **÷** (2)]  1 – tax rate  (3) Interest expense x (1 − tax rate)  $14,620 x 59.50%  $12,100 x 59.00%  $11,250 x 57.70%  (4) Net earnings  (3) + (4) (A)  (5) Average long-term debt  (6) Average shareholders’ equity  (5) + (6) (B)  (A) **÷** (B) | $116,473  $287,588  40.50%  59.50%  8,699  171,115  179,814  120,000  406,000  526,000  34.19% | $113,616  $277,113  41.00%  59.00%  7,139  163,497  170,636  112,000  369,500  481,500  35.44% | $105,560  $249,550  42.30%  57.70%  6,491  143,990  150,481  101,000  342,000  443,000  33.97% |

Net Income Before Nonrecurring Items −

6. Return on Total Equity = Dividends on Redeemable Preferred Stock

Average Total Equity

|  |  |  |  |
| --- | --- | --- | --- |
|  | 2009 | 2010 | 2011 |
| Net earnings  Average total equity | $171,115  $406,000  = 42.15% | $163,497  $369,500  = 44.25% | $143,990  $342,000  = 42.10% |

7. 

|  |  |  |
| --- | --- | --- |
| 2009 | 2010 | 2011 |
| $1,002,100  $302,500  = 3.31 | $980,500  $281,000  = 3.49 | $900,000  $173,000  = 5.20 |

b. The ratios computed indicate a very profitable firm. Most ratios indicate a very slight reduction in profitability in 2009.

Sales to fixed assets has declined materially, but this is the only ratio for which the trend appears to be negative.

PROBLEM 8-8

Net Income Before Minority Share of

a. 1. Net Profit Margin = Earnings Equity Income and Nonrecurring Items

Net Sales

|  |  |  |
| --- | --- | --- |
| 2011 | 2010 | 2009 |
| $20,070 − $8,028  $297,580  = 4.05% | $16,660 − $6,830  $256,360  = 3.83% | $15,380 − $6,229  $242,150  = 3.78% |

2. 

|  |  |  |
| --- | --- | --- |
| 2011 | 2010 | 2009 |
| $20,070 − $8,028  $145,760  = 8.26% | $16,660 − $6,830  $137,000  = 7.18% | $15,380 − $6,229  $136,000  = 6.73% |

3. 

|  |  |  |
| --- | --- | --- |
| 2011 | 2010 | 2009 |
| $297,580  $145,760  = 2.04 times  per year | $256,360  $137,000  = 1.87 times  per year | $242,150  $136,000  = 1.78 times  per year |

4. DuPont Analysis

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Return on  Assets | = | Operating Income  Margin | x | Total Asset  Turnover |
| 2011: 8.26%  2010: 7.16%\*  2009: 6.73% | =  =  = | 4.05%  3.83%  3.78% | x  x  x | 2.04 times  1.87 times  1.78 times |

\*Rounding difference from the 7.18% computed in (2).

5. 

|  |  |  |
| --- | --- | --- |
| 2011 | 2010 | 2009 |
| $ 26,380  $297,580  = 8.86% | $ 22,860  $256,360  = 8.92% | $ 20,180  $242,150  = 8.33% |

6. 

|  |  |  |
| --- | --- | --- |
| 2011 | 2011 | 2009 |
| $26,380  $89,800 + $45,850  = 19.45% | $22,860  $84,500 + $40,300  = 18.32% | $20,180  $83,100 + $39,800  = 16.42% |

7. 

|  |  |  |
| --- | --- | --- |
| 2011 | 2010 | 2009 |
| = 2.19 times  per year | = 2.05 times  per year | = 1.97 times  per year |

8. DuPont Analysis with Operating Ratios

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Return on  Assets | = | Operating Income  Margin | x | Total Asset  Turnover |
| 2011: 19.40%\*  2010: 18.29%\*  2009: 16.41%\* | =  =  = | 8.86%  8.92%  8.33% | x  x  x | 2.19 times  2.05 times  1.97 times |

\*Rounding difference from the 19.45%, 18.32%, and 16.42% computed in (6).

9. 

|  |  |  |  |
| --- | --- | --- | --- |
| 2011 | 2010 | 2009 | |
| $91,580  $297,580  = 30.77% | $80,060  $256,360  = 31.23% | $76,180  $242,150  = 31.46% |

b. Net profit margin and total asset turnover both improved. This resulted in a substantial improvement to return on assets.

Operating income margin declined slightly in 2009 after a substantial improvement in 2010. Operating asset turnover improved each year. The result of the improvement in operating income margin and operating asset turnover was a substantial improvement in return on operating assets.

Gross profit margin declined slightly each year.

Overall profitability improved substantially over the three-year period.

PROBLEM 8-9

a. 1. 

|  |  |  |  |
| --- | --- | --- | --- |
|  | 2011 | 2010 | 2009 |
| (A)  (B) | $ 2,100,000  $ 2,600,000  7,000,000  100,000  10,000,000  $19,700,000 | $ 1,950,000  $ 2,300,000  6,200,000  100,000  9,000,000  $17,600,000 | $ 1,700,000  $ 2,200,000  5,800,000  100,000  8,300,000  $16,400,000 |
| (A) ÷ (B) | 10.66% | 11.08% | 10.37% |

Net Income Before Minority Share of

Earnings and Nonrecurring Items +

2. Return on Investment = [Interest Expense x (1 − Tax Rate)]

Average (Long-Term Liabilities + Equity)

Estimated tax rate:

|  |  |  |  |
| --- | --- | --- | --- |
|  | 2011 | 2010 | 2009 |
| (1) Provision for income taxes  (2) Income before tax  Tax rate = (1) **÷** (2)  1 – tax rate  (3) Interest expense x (1 – tax rate)  $800,000 x 58.33%  $600,000 x 57.35%  $550,000 x 61.82%  (4) Net income  (3) + (4) (A)  Long-term debt  Preferred stock  Common equity  (B)  (A) **÷** (B) | $ 1,500,000  3,600,000  41.67%  58.33%  $ 466,640  $ 2,100,000  $ 2,566,640  $ 7,000,000  100,000  10,000,000  $17,100,000  15.01% | $ 1,450,000  3,400,000  42.65%  57.35%  $ 344,100  $ 1,950,000  $ 2,294,100  $ 6,200,000  100,000  9,000,000  $15,300,000  14.99% | $ 1,050,000  2,750,000  38.18%  61.82%  $ 340,010  $ 1,700,000  $ 2,040,010  $ 5,800,000  100,000  8,300,000  $14,200,000  14.37% |

Net Income Before Nonrecurring Items −

3. Return on Total Equity = Dividends on Redeemable Preferred Stock

Average Total Equity

|  |  |  |
| --- | --- | --- |
| 2011 | 2010 | 2009 |
| = 20.79% | = 21.43% | = 20.24% |

Net Income Before Nonrecurring

4. Return on Common Equity = Items − Preferred Dividends

Average Total Equity

|  |  |  |
| --- | --- | --- |
| 2011 | 2010 | 2009 |
| = 20.86% | = 21.51% | = 20.31% |

b. Return on assets improved in 2010 and then declined in 2011. Return on investment improved each year. Return on total equity improved and then declined. Return on common equity improved and then declined.

In general, profitability has improved in 2010 over 2009 but was down slightly in 2011.

c. The use of long-term debt and preferred stock both benefited profitability.

Return on common equity is slightly more than return on total equity, indicating a benefit from preferred stock.

Return on total equity is substantially higher than return on investment, indicating a benefit from long-term debt.

PROBLEM 8-10

a. Sales $120,000

Gross profit (40%) 48,000

Cost of goods sold (60%) $ 72,000

Beginning inventory $ 10,000

+ Purchases 100,000

Total available $110,000

− Ending inventory ?

Cost of goods sold $ 72,000

Ending inventory ($110,000 − $72,000) $ 38,000

b. If gross profit were 50%, the analysis would be as follows:

Sales $ 120,000

Gross profit (50%) 60,000

Cost of goods sold (50%) $ 60,000

Beginning inventory $ 10,000

+ Purchases 100,000

Total available $ 110,000

− Ending inventory 50,000

Cost of goods sold $ 60,000

If gross profit were higher, the loss would be higher.

PROBLEM 8-11

|  |  |  |  |
| --- | --- | --- | --- |
|  | Net  Profit | Retained  Earnings | Total  Stockholders’  Equity |
| a. A stock dividend is  declared and paid.  b. Merchandise is purchased  on credit.  c. Marketable securities are  sold above cost.  d. Accounts receivable are  collected.  e. A cash dividend is  declared and paid.  f. Treasury stock is  purchased and recorded  at cost.  g. Treasury stock is sold  above cost.  h. Common stock is sold.  i. A fixed asset is sold for  less than book value.  j. Bonds are converted into  common stock. | 0  0  +  0  0  0  0  0  −  0 | −  0  +  0  −  0  0  0  −  0 | 0  0  +  0  −  −  +  +  −  + |